

AMENDMENTS TO THE CLAIMS:

Please cancel Claims 33-70, without prejudice or disclaimer. Applicants specifically reserve the right to file appropriate continuing and/or divisional applications drawn to the subject matter of these claims.

Please add new Claims 71-87.

The following listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

Claim 1 (withdrawn): A method of identifying associated cell signaling proteins, the method comprising:

- a) producing and storing a comparison value for each pair of said cell signaling proteins in response to data values representing physical properties of respective cell signaling proteins; and
- b) identifying cell signaling protein pairs having comparison values satisfying a condition indicative of an association between the cell signaling proteins.

Claim 2 (withdrawn): The method of claim 1 wherein producing and storing comprises producing and storing in a random access memory, said comparison value.

Claim 3 (withdrawn): The method of claim 1 further comprising normalizing said data values relative to at least one reference value, prior to producing said comparison values.

Claim 4 (withdrawn): The method of claim 1 wherein identifying comprises producing a list of pairs of associated cell signaling proteins.

Claim 5 (withdrawn): The method of claim 1 wherein identifying comprises producing a list of clusters of associated cell signaling proteins.

Claim 6 (withdrawn): The method of claim 4 wherein identifying further comprises identifying a cluster of associated cell signaling proteins, said cluster comprising a group of said pairs of associated cell signaling proteins for which each member of each said pair is present in at least one other pair of said group.

Claim 7 (withdrawn): The method of claim 5 wherein identifying each said cluster comprises:

- a) generating a cluster list associated with a first cell signaling protein pair, said cluster list comprising an identification of said first cell signaling protein pair;
- b) adding, to said cluster list, an identification of each of said pairs that includes at least one cell signaling protein already present in said cluster list;
- c) repeating said adding following each said adding of pairs to said cluster list, to effectively add to said cluster list each of said pairs that includes at least one cell signaling protein present in at least one pair added to said cluster list;
- d) eliminating, from said cluster list, each of said pairs that includes at least one cell signaling protein not found in at least one other pair in said cluster list; and
- e) repeating said eliminating following each said eliminating of pairs, to effectively eliminate from said cluster list each of said pairs that includes at least one cell signaling protein not present in at least one other non-eliminated pair in said cluster list.

Claim 8 (withdrawn): The method of claim 1 further comprising receiving sets of cell signaling protein data, each set comprising said data values, said data values representing amounts of respective corresponding cell signaling proteins in biological material corresponding to said set.

Claim 9 (withdrawn): The method of claim 8 wherein producing said comparison values comprises producing a coexpression coefficient for each pair of said cell signaling proteins, each said coexpression coefficient representing a degree of coexpression of one cell signaling protein of said pair and the other cell signaling protein of said pair (withdrawn):

Claim 10 (withdrawn): The method of claim 9 wherein producing each said coexpression coefficient comprises:

- a) for each set, calculating a difference value equal to an absolute value of a difference between said data value corresponding to said one cell signaling protein and said data value corresponding to said other cell signaling protein; and
- b) adding said difference values for each of said sets to produce a sum of difference values.

Claim 11 (withdrawn): The method of claim 10 wherein producing each said coexpression coefficient further comprises dividing said sum by the number of said sets to

produce said coexpression coefficient corresponding to said one cell signaling protein and said other cell signaling protein.

Claim 12 (withdrawn): The method of claim 10 wherein identifying cell signaling protein pairs comprises identifying each cell signaling protein pair having a coexpression coefficient less than or equal to a threshold coexpression value.

Claim 13 (withdrawn): The method of claim 10 wherein identifying cell signaling protein pairs comprises producing a list of coexpressed cell signaling protein pairs, said list comprising an identification of each said cell signaling protein pair having a coexpression coefficient less than or equal to said threshold coexpression value.

Claim 14 (withdrawn): The method of claim 13 wherein identifying cell signaling protein pairs further comprises producing a list of clusters of coexpressed cell signaling protein pairs, each said cluster comprising a group of said coexpressed cell signaling protein pairs for which each member of each pair is present in at least one other pair of said group.

Claim 15 (withdrawn): The method of claim 1 further comprising receiving sets of cell signaling protein data, each set comprising said data values, said data values indicating

phosphorylation states of respective cell signaling proteins in biological material corresponding to said set.

Claim 16 (withdrawn): The method of claim 15 wherein producing said comparison values comprises producing a coregulation coefficient for each pair of said cell signaling proteins, each said coregulation coefficient representing a degree of coregulation of one cell signaling protein of said pair and the other cell signaling protein of said pair.

Claim 17 (withdrawn): The method of claim 16 wherein producing each said coregulation coefficient comprises:

- a) for each set, assigning a pair state value as a function of phosphorylation states of said one cell signaling protein and said other cell signaling protein; and
- b) adding said pair state values for each of said sets to produce a sum of pair state values.

Claim 18 (withdrawn): The method of claim 17 wherein producing each said coregulation coefficient further comprises dividing said sum by the number of said sets to produce said coregulation coefficient corresponding to said one cell signaling protein and said other cell signaling protein.

Claim 19 (withdrawn): The method of claim 17 wherein assigning a pair state value comprises:

- a) assigning a first pair state value when said one cell signaling protein and said other cell signaling protein are both in a phosphorylated state;
- b) assigning a second pair state value when said one cell signaling protein and said other cell signaling protein are both in a dephosphorylated state, said second pair state value being less than said first pair state value; and
- c) assigning a third pair state value when said one cell signaling protein and said other cell signaling protein are in different phosphorylation states, said third pair state value being less than said second pair state value.

Claim 20 (withdrawn): The method of claim 17 wherein identifying cell signaling protein pairs comprises identifying each cell signaling protein pair having a coregulation coefficient greater than a threshold coregulation value.

Claim 21 (withdrawn): The method of claim 20 wherein identifying cell signaling protein pairs further comprises producing a list of coregulated cell signaling protein pairs, said list comprising an identification of each said cell signaling protein pair having a coregulation coefficient greater than said threshold coregulation value.

Claim 22 (withdrawn): The method of claim 21 wherein identifying cell signaling protein pairs further comprises producing a list of clusters of coregulated cell signaling protein pairs, each said cluster comprising a group of said coregulated cell signaling protein pairs for which each member of each pair is present in at least one other pair of said group.

Claim 23 (original): The method of claim 1 wherein producing a comparison value comprises producing a linkage coefficient for each pair of said cell signaling proteins, as a function of a coexpression coefficient representing a degree of coexpression of one cell signaling protein of said pair and the other cell signaling protein of said pair, and of a coregulation coefficient representing a degree of coregulation of said one cell signaling protein of said pair and said other cell signaling protein of said pair, each said linkage coefficient representing a degree of association between said one cell signaling protein and said other cell signaling protein.

Claim 24 (original): The method of claim 23 wherein producing said linkage coefficient comprises, for each said pair, dividing said coregulation coefficient by said coexpression coefficient.

Claim 25 (original): The method of claim 24 further comprising producing a list of linked cell signaling protein pairs, said list comprising an identification of each said cell

signaling protein pair having a linkage coefficient greater than or equal to a threshold linkage value.

Claim 26 (original): The method of claim 24 further comprising associating at least some of said cell signaling proteins with respective common signaling pathways, in response to said linkage coefficients.

Claim 27 (original): The method of claim 26 wherein associating comprises identifying a group of said cell signaling proteins for which each said linkage coefficient linking each cell signaling protein to each other cell signaling protein of said group is greater than or equal to a threshold linkage value.

Claim 28 (original): The method of claim 27 wherein identifying said group comprises:

- a) generating a linkage list comprising a first cell signaling protein;
- b) adding, to said linkage list, each other said cell signaling protein for which said linkage coefficient for said first cell signaling protein and said other cell signaling protein is greater than or equal to said threshold linkage value; and
- c) eliminating, from said linkage list, each cell signaling protein on said linkage list for which said linkage coefficient for said each cell signaling protein and at least one other cell signaling protein on said linkage list is less than said threshold linkage value.

Claim 29 (original): The method of claim 27 further comprising producing lists of said common signaling pathways.

Claim 30 (withdrawn): The method of claim 1 further comprising producing said data values representing said physical properties of said respective cell signaling proteins.

Claim 31 (withdrawn): The method of claim 30 wherein producing said data values comprises producing signals representative of proteins in a single dimension in an electrophoresis gel.

Claim 32 (withdrawn): The method of claim 31 further comprising producing said electrophoresis gel.

Claims 33-70 (cancelled)

Claim 71 (new): The method of claim 1, wherein physical properties of respective cell signaling proteins are resolved electrophoretically.

Claim 72 (new): The method of claim 1, wherein physical properties of respective cell signaling proteins are obtained by Western blotting.

Claim 73 (new): A method of identifying associated cell signaling proteins, the method comprising:

- a) producing and storing a comparison value for each pair of said cell signaling proteins in response to data values representing physical properties of respective cell signaling proteins; and
- b) identifying cell signaling protein pairs having comparison values satisfying a condition indicative of an association between the cell signaling proteins,

wherein producing a comparison value comprises producing a linkage coefficient for each pair of said cell signaling proteins, as a function of a coexpression coefficient representing a degree of coexpression of one cell signaling protein of said pair and the other cell signaling protein of said pair, and of a coregulation coefficient representing a degree of coregulation of said one cell signaling protein of said pair and said other cell signaling protein of said pair, each said linkage coefficient representing a degree of association between said one cell signaling protein and said other cell signaling protein, and wherein, producing said linkage coefficient comprises, for each said pair, dividing said coregulation coefficient by said coexpression coefficient.

Claim 74 (new): The method of claim 73 wherein producing and storing comprises producing and storing in a random access memory, said comparison value.

Claim 75 (new): The method of claim 73 further comprising normalizing said data values relative to at least one reference value, prior to producing said comparison values.

Claim 76 (new): The method of claim 73 wherein identifying comprises producing a list of pairs of associated cell signaling proteins.

Claim 77 (new): The method of claim 73 wherein identifying comprises producing a list of clusters of associated cell signaling proteins.

Claim 78 (new): The method of claim 76 wherein identifying further comprises identifying a cluster of associated cell signaling proteins, said cluster comprising a group of said pairs of associated cell signaling proteins for which each member of each said pair is present in at least one other pair of said group.

Claim 79 (new): The method of claim 77 wherein identifying each said cluster comprises:

- a) generating a cluster list associated with a first cell signaling protein pair, said cluster list comprising an identification of said first cell signaling protein pair;
- b) adding, to said cluster list, an identification of each of said pairs that includes at least one cell signaling protein already present in said cluster list;

- c) repeating said adding following each said adding of pairs to said cluster list, to effectively add to said cluster list each of said pairs that includes at least one cell signaling protein present in at least one pair added to said cluster list;
- d) eliminating, from said cluster list, each of said pairs that includes at least one cell signaling protein not found in at least one other pair in said cluster list; and
- e) repeating said eliminating following each said eliminating of pairs, to effectively eliminate from said cluster list each of said pairs that includes at least one cell signaling protein not present in at least one other non-eliminated pair in said cluster list.

Claim 80 (new): The method of claim 73 further comprising receiving sets of cell signaling protein data, each set comprising data values representing amounts of respective corresponding cell signaling proteins in biological material corresponding to said set, wherein producing each said coexpression coefficient comprises:

- a) for each set of data values representing amounts of respective corresponding cell signaling proteins in biological material, calculating a difference value equal to an absolute value of a difference between said data value corresponding to said one cell signaling protein and said data value corresponding to said other cell signaling protein; and
- b) adding said difference values for each of said sets to produce a sum of difference values.

Claim 81 (new): The method of claim 80 wherein producing each said coexpression coefficient further comprises dividing said sum by the number of said sets to produce said coexpression coefficient corresponding to said one cell signaling protein and said other cell signaling protein.

Claim 82 (new): The method of claim 73 further comprising receiving sets of cell signaling protein data, each set comprising data values indicating phosphorylation states of respective cell signaling proteins in biological material corresponding to said set, wherein producing each said coregulation coefficient comprises:

- a) for each set of data values indicating phosphorylation states of respective cell signaling proteins in biological material, assigning a pair state value as a function of phosphorylation states of said one cell signaling protein and said other cell signaling protein; and
- b) adding said pair state values for each of said sets to produce a sum of pair state values.

Claim 83 (new): The method of claim 82 wherein assigning a pair state value comprises:

- a) assigning a first pair state value when said one cell signaling protein and said other cell signaling protein are both in a phosphorylated state;

- b) assigning a second pair state value when said one cell signaling protein and said other cell signaling protein are both in a dephosphorylated state, said second pair state value being less than said first pair state value; and
- c) assigning a third pair state value when said one cell signaling protein and said other cell signaling protein are in different phosphorylation states, said third pair state value being less than said second pair state value.

Claim 84 (new): The method of claim 73 further comprising associating at least some of said cell signaling proteins with respective common signaling pathways, in response to said linkage coefficients.

Claim 85 (new): The method of claim 84 wherein associating comprises identifying a group of said cell signaling proteins for which each said linkage coefficient linking each cell signaling protein to each other cell signaling protein of said group is greater than or equal to a threshold linkage value.

Claim 86 (new): The method of claim 85 wherein identifying said group comprises:

- a) generating a linkage list comprising a first cell signaling protein;

- b) adding, to said linkage list, each other said cell signaling protein for which said linkage coefficient for said first cell signaling protein and said other cell signaling protein is greater than or equal to said threshold linkage value; and
- c) eliminating, from said linkage list, each cell signaling protein on said linkage list for which said linkage coefficient for said each cell signaling protein and at least one other cell signaling protein on said linkage list is less than said threshold linkage value.

Claim 87 (new): The method of claim 86 further comprising producing lists of said common signaling pathways.